ISOSTATIC GRAVITY MAP OF EASTERN CARIBBEAN REGION

Thirty-nine newly reduced gravity stations are incorporated with other published and unpublished data to produce a Pratt-Hayford isostatic gravity map of the Antilles Islands and Venezuelan basin. Negative and positive isostatic anomaly belts of the West Indies island arc are delineated.

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CALCAREOUS NANNOPLANKTON AND BIOSTRATIGRAPHIC SUBDIVISION OF UPPER CRETACEOUS

Calcareous nannoplankton fossils of the Tertiary generally are well known, and their importance in stratigraphy has been amply demonstrated. Cretaceous calcareous nannofossils have been described in several papers, and many species can be recognized. Workable stratigraphic schemes for subdivision of the Upper Cretaceous have been slow to evolve because of (1) the great diversity of Upper Cretaceous assemblages, (2) the similarity of many coccolith species in this interval, and (3) the lack of continuous sections with adequate, well-preserved nannofossil floras.

Twelve zones based on calcareous nannofossils are recognized within the Cenomanian-Maastrichtian, approximating the degree of subdivision readily attainable with planktonic foraminifers. Four of the zones lie within the Cenomanian-Turonian interval, another four probably within the Coniacian-Santonian, and four within the Campanian-Maastrichtian. Many of the genera and species characteristic of the Upper Cretaceous evolved during the Cenomanian. The increase in diversity is a marked feature of Cenomanian and Turonian assemblages. Diversity remained more or less constant until the Maastrichtian, but evolution proceeded rapidly in some groups, such as *Arkhangelskiella, Kamptnerius,* and some other coccolith genera during the Coniacian-Santonian. The Campanian was a period of relative evolutionary quiescence, and is generally difficult to subdivide. The Maastrichtian is characterized by successive elimination of many species with a resulting decrease in diversity of the assemblages. The end of the Maastrichtian coincides with an abundance-diversity minimum marking a level of great change in calcareous nannoplankton fossil assemblages.

Reference sections for the zones which are recognized are in Kansas and Alabama. The section along the Alabama River between Selma and Millers Ferry is particularly valuable as one of the best exposed series of outcrops available. It also provides rich, diverse, well-preserved calcareous nannofloras at all levels.

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COMPARISON OF ELECTRICAL LOGS AND PHYSICAL PARAMETERS OF MARINE-SEDIMENT CORES

Spontaneous potential and modified point resistivity logs were made from select cores of marine sediments. The logs have been compared with cone penetrometer and vane shear measurements, shipboard pH and Eh tests, X-ray radiographs and photographs, and water content, density, carbonate content, and grain size analyses from the same cores.

Indications are that electric logs can be of value in identifying zones of interest which have subtle property differences, can be used to correlate from one core to another, and display apparent relations to other properties.

Improvements in instruments and techniques may lead to the *in-situ* quantitative application of electric logging techniques in all depths of water.

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REDEPOSITION OF PELAGIC SEDIMENT BY TURBIDITY CURRENTS; A COMMON PROCESS FOR BUILDING ABYSSAL PLAINS

Reworked pelagic detritus forms most graded beds from the upper 10-20 m of most abyssal plains. Coccoliths are by far the commonest detrital particle in many of the abyssal plains and are present with discoasters in the fine silt fraction, whereas reworked radiolaria, diatoms and planktonic Foraminifera are present in the coarse-silt and fine-sand fractions. Piston and gravity cores from the Argo and Gascoyne abyssal plains off northwest Australia contain graded beds which consist of pelagic detritus sorted into layers of either Radiolaria, diatoms or planktonic Foraminifera. These layers clearly define the basal part of many graded beds of different color shades. The source for most of the sediment must lie in the pelagic oozes of the adjacent abyssal hills and rises and not in the upper continental slope and shelf areas. There is increasing evidence that density currents commonly originate in the closer fan valleys and rises flanking the abyssal plains and uncommonly on the upper continental slope.

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LET'S IMPROVE OUR WILCOX SUCCESS RATE!

For the last three years exploratory success in the Eocene Wilcox Formation of southwestern Mississippi has averaged 6.7%, far below the success of 1951–1953 when an 11% success rate was achieved with less than a third of the wildcat wells now available for control. If we are to reverse this trend, the geologists must improve sampling and testing procedures in the field and more effectively utilize well data in the office and laboratory.

Serious errors in elevations and well locations, deviated hole problems, inadequate sampling of wildcat wells, and incomplete evaluation of oil shows have contributed to an excessive number of dry holes.

The present success rate can be improved by greater use of isopach maps to supplement structural contouring, by a better understanding of the relation of oil to regional subsidence and remigration, and by more careful evaluation of core analyses to differentiate between live oil and residual oil.

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PROBLEMS OF TECTONIC RELATIONS BETWEEN LESSER ANTILLES, VENEZUELA, AND TRINIDAD-TOBAGO

(No abstract submitted)

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UPPER JURASSIC CARBONATE ROCKS IN NORTHEASTERN TEXAS AND ADJOINING PARTS OF ARKANSAS AND LOUISIANA[1]

Carbonate rocks make up only a small part of the total Upper Jurassic sequence, but they are widespread and are sensitive indicators of their environments of deposition. Consequently, carbonate studies have yielded data vital for stratigraphic correlation and interpretation of environment. Rocks of Upper Jurassic age include, in ascending order, the Smackover and Buckner Formations and the Bossier and Schuler Formations of the Cotton Valley Group. These rocks are in the subsurface at depths ranging from 3,000 to 12,000 ft.

The Smackover Formation contains three informal members. The lower member, one of the most widespread and easily recognized units of Late Jurassic age, consists of dark-gray, commonly laminated, silty to argillaceous limestone, that was deposited throughout a deep, possibly stagnant, basin. The middle member, generally restricted to basin margins, consists of medium-brown pelletoid or structureless limestone deposited in the shallower parts of a basin that supported a relatively abundant fauna. The upper member, also limited to basin margins, consists mostly of light-brown to black oölitic to pisolitic limestone that represents deposition in a shallow-water high-energy environment. This member includes the petroleum-producing Reynold's oölite.

The Buckner Formation contains two members. The lowest member consists mostly of laminated micrograined anhydrite and anhydritic mudstone, but in restricted areas consists of fine-grained dolomite. It represents deposition in an evaporitic basin and associated mudflats. The upper member consists mostly of nodular anhydritic mudstone that represents deposition in evaporitic mudflat. It contains a bed of limestone, known locally as the A zone, that represents a temporary advancement of the sea across the mudflat.

The Bossier Formation represents the offshore equivalent of the Buckner and parts of the Smackover and Schuler Formations. It consists mostly of dark-gray splintery calcareous shale, but contains shell material in various amounts. A limestone at the base of the Q tongue consists mostly of silty micrite containing a fossil assortment that is characterized by algal-encrusted grains but also includes foraminifers, gastropods, ostracods, and echinoid fragments.

The Schuler Formation, which includes a marine and a nonmarine facies, consists mostly of mudstone, shale, and sandstone but contains some limestone in the marine facies. Algal micrite is present in the upper part, and some argillaceous coquina and phosphatic clastic limestone that apparently represent beach environments are present near the base.

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LIST, BIBLIOGRAPHY, AND INDEX OF FOSSIL VERTEBRATES OF LOUISIANA AND MISSISSIPPI

Species of fossil vertebrates reported from Louisiana and Mississippi are listed. The bibliography consists of 167 titles and contains detailed annotations on vertebrates from those states. Both systematic and chronologic-geographic indexes are provided.

[1] Publication authorized by the Director, U.S. Geol. Survey.

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LATE NEOGENE PALYNOMORPH DIAGRAMS, NORTHERN GULF OF MEXICO

The cyclic nature of late Neogene climate is reflected in the relative frequency diagrams of palynomorphs deposited in the northern Gulf of Mexico. A general cooling through the late Neogene and at least five glacial cycles for the Quaternary are indicated. An additional prominent cold cycle in latest Miocene time is interpreted from the frequency diagram of *Picea*, spruce. The Pliocene-Pleistocene boundary is marked by an abundance of *Ambrosia* and *Helianthus* types of Compositae pollen below and increased frequency of *Alnus* and *Exesisporites* above. A new species of fungal spore occurs abundantly in the lower part of the Pleistocene and also lower in the Neogene.

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PROFILE ANALYSIS—A GEOLOGICALLY ORIENTED GRAVITY INTERPRETATION

A byproduct of the examination of three different analytic methods of reducing gravity data to a form useful to the geologists is the presentation of the local gravitational field of one complete quadrangle in the Jurassic trend of Mississippi. The major salt dome minima are qualitatively confirmed by all three methods, although the quantitative effects vary. The more subtle effects of the Jurassic features are more susceptible to distortion by the process of removing the influence of regional density changes. The least distorting method of regional removal is shown to be the interlocking profile network. This technique obtains the most definitive resolution of the local gravitational effects of deep, low-volume structures.

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DEPOSITIONAL EPISODES: THEIR RELATION TO QUATERNARY SEA-LEVEL FLUCTUATIONS IN GULF COAST REGION

The stratigraphic record yields evidence that each episode of clastic deposition has been of limited duration and that each has been preceded and followed by a significant hiatus. Evidence for alternations of deposition and nondeposition is readily apparent in the landward part of Pleistocene sequences along the Gulf Coast because of the glacioeustatic changes in sea level. Evidence of alternations, although elusive, exists also in the basinward part of the sequences. The concept of depositional episodes explains the significance and relation of these alternating conditions throughout the basin for clastic Pleistocene sequences.

A depositional episode is the duration of time required for the sedimentation of a depositional sequence. The depositional sequence attributed to each depositional episode is composed of several discrete facies sequences. A facies sequence consists of either a single delta lobe within a deltaic complex or one of the several repetitive facies sequences deposited in an interdeltaic environment.

Each depositional sequence indicates three phases of development. Deposits of the initial phase record a stillstand of the sea during which each of the rivers entering the basin prograded a succession of delta lobes and interdeltaic facies sequences. The second phase of development is recorded by the intercalation